

ABSTRACT

The present invention relates generally to sub-microelectronic circuitry, and more particularly to nanometer-scale articles, including nanoscale wires which can be selectively doped at various locations and at various levels. In some cases, the articles
5 may be single crystals. The nanoscale wires can be doped, for example, differentially along their length, or radially, and either in terms of identity of dopant, concentration of dopant, or both. This may be used to provide both n-type and p-type conductivity in a single item, or in different items in close proximity to each other, such as in a crossbar array. The fabrication and growth of such articles is described, and the arrangement of
10 such articles to fabricate electronic, optoelectronic, or spintronic devices and components. For example, semiconductor materials can be doped to form n-type and p-type semiconductor regions for making a variety of devices such as field effect transistors, bipolar transistors, complementary inverters, tunnel diodes, light emitting diodes, sensors, and the like.